CLAIMS

1. Equipment for use in the removal of relatively fine particulates from a first substance, using a second substance, the equipment including a static, co-current contacting mixer section having a plurality of stages defining a flow path, with a flow profile, for the first and the second substance, at least some of the stages being shaped to define a substantially curved flow path having an effective centre of curvature located to one side of the flow path, and wherein each adjacent stage has a centre of curvature on an opposite side of the flow path to provide a point of inflexion between adjacent stages and whereby, as the substances flow through the mixer section between the adjacent stages, particles present in the first substance migrate through the second substance, first in one direction and then in a substantially opposite direction to promote interphasic interaction between the first and the second substance, the flow path characterised in being provided with an edge formation between at least two adjacent stages towards the point of inflexion so as to enhance the launch of the second substance on the outside of the curved flow path of one stage at relatively high velocity from the edge formation to the inside of the curved flow path of the adjacent stage, thus increasing the contact between the first and the second substances.

2. Equipment as claimed in claim 1 wherein the first substance is a gas and the second substance is a scrubbing fluid.

3. Equipment as claimed in claim 2 wherein the edge formation is stepped, with a substantially perpendicular face relative to the edge formation to enhance the launch of the scrubbing fluid.

4. Equipment as claimed in claim 3 wherein the stepped edge formation is provided with a ledge subsequent to the step to define a first and a second step, the first and the second step being arranged so as to encourage a small back eddy of gas immediately beneath the first step that deflects any downwards dribble of scrubbing fluid around stepped edge back up into the underside of the main fluid flow as it leaves the first step so as to enhance the contact between the launched fluid and the gas.

5. Equipment as claimed in claim 4 wherein the stepped edge has a fillet radius to ensure maximum effect from the swirl and scouring action from the back eddy, which is encouraged within the stepped edge.

6. Equipment as claimed in claim 5 wherein the step has a similar depth and width relative to the stepped edge.

7. Equipment as claimed in claim 1 wherein the mixer section is provided with an edge formation towards each point of inflexion.

8. Equipment as claimed in claim 7 wherein the flow path is configured and dimensioned to orientate both the angle and the position of each launch with respect to the subsequent shape of the flow profile and the controlled change

39. Equipment as claimed in claim 38 wherein the annular gap is configured and dimensioned to pass debris that could access the equipment and wider than the typical maximum splash and spray layer that would accompany the scrubbing fluid as it runs down the inner walls of the cyclonic section.

Equipment as claimed in claim 33 wherein the gap is configured and dimensioned so that the minimum width of the annular gap at the vortex finder is based on the concept of capturing all the splash and spray into this ular area.

41. Equipment as claimed in claim 33 wherein the mixer section, the spinner section and the cyclonic section are cast in a single, substantially integral unit.

42. A method for the removal of relatively fine particulates from a first substance, using a second substance, the method including the steps of transporting the first substance and the second substance through a plurality of stages in a flow path, at least some of the stages being shaped to define a substantially curved flow path having an effective centre of curvature located to one side of the flow path, and wherein each adjacent stage has a centre of curvature on an opposite side of the flow path to provide a point of inflexion between adjacent stages, the flow path being provided with an edge formation between at least two adjacent stages towards the point of inflexion and whereby, as the first substance and the second substance flow through the reactor between the adjacent stages, particles present in the first substance

migrate through the second substance, first in one direction and then in a substantially opposite direction to promote interphasic interaction between the first substance and the second substance; and launching the second substance on the outside of the curved flow path from the edge formation at relatively high velocity to the inside of the curved flow path of the adjacent stage.

43. A method as claimed in claim 42 wherein the first substance is a gas and the second substance is a scrubbing fluid.

44. A method as claimed in claim 42 characterized in achieving removal efficiencies of above 90% of particle sizes of less than 0.05 micron.

45. A method as claimed in claim 43 characterized in being suitable for scrubbing waste gas from a modern high-performance Sinter Plant, using a suitable scrubbing fluid.

46. A method as claimed in claim 43 including the step of adding a relatively fine dust upstream of the mixer section to enhance the removal of vapours in the gas.

47. A method as claimed in claim 46 wherein the fine dust is pre-selected so as to enhance the chemisorbtion on to the dust of gasses and vapours selected from the group consisting of dibenzo furan, PCB, related compounds and any combinations thereof.

48. A plastics material for the manufacture of equipment as claimed in claim 1, the material comprising an abrasion resistant composite selected from the group consisting of a filler, Silicon Carbide and a vinyl ester resin.

49. A plastics material as claimed in claim 48 wherein the filler is selected from the group consisting of silica, alumina, glass fibre and any combination thereof.

50. A plastics material as claimed in claim 48 wherein the material is subjected to Silane pre-treatment.

51. A plastics material as claimed in claim 48 wherein the Silicon Carbide has a predetermined particle size and size distribution.

52. A plastics material as claimed in claim 51 wherein the Silicon Carbide has a particle size and size distribution of a combination of 10 and 60 mesh particulate material, thus providing the required abrasion and impact resistance.

53. A plastics material as claimed in claim 52 wherein the Silicon Carbide consists of pre-selected mixtures of 10 mesh solids with 60 mesh solids, thus obtaining the predetermined mixing and flow properties that enhances the moulding process and the ultimate abrasion and impact resistance of the equipment.

54. A plastics material as claimed in claim 48 including hollow and sponge-like fine particles so as to impart a degree of elasticity and overall sponginess to the resin.

55. A plastics material as claimed in claim 54 wherein the fine particles have sufficient chemical resistance so as not to be degraded by the environment and are small relative to at least some of the filler particles.

56. A plastics material as claimed in claim 54 wherein the fine particles include hollow glass spheres and both hollow and sponge-like kaolin particles.